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Ta Tao, P.I. 101686, Affects Bloom Date and Tree Size of 'Sunprince' Peach[1]

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Abstract

The latest blooming peach at Byron is P.I. 101686, Ta Tao #24, from Shandong, China. In a preliminary trial as a rootstock, it delayed bloom in 'Sunprince' by 4-10 days and reduced trunk girth by one-third after 5 years, compared to 'Flordaking' and 'Redglobe' used as rootstocks It is not known if stock chilling requirement, stock vigor, virus interaction or unknown factors caused delayed bloom and reduced tree growth.

Introduction

The USDA peach germplasm collection at the Southeastern Fruit and Tree Nut Research Laboratory contains hundreds of clones with diverse characteristics. Several of a series of Chinese peaches (P.I. 101663-101669, 101667-101689) are the latest blooming of all peaches at Byron. Full bloom is typically April 1 compared to February 25 for 'Flordaking,' March 11 for 'Springcrest,' March 19 for 'Redglobe,' and March 24 for 'Redhaven.'

This group of peaches was collected by Peter Liu in 1933 as scions of individual trees from several villages near Feicheng, Shantung (now Shandong), China (36°N X 118°E). They were labeled "Ta Tao" or Fei peach, probably the same as 'Fiechangtao,' a cultivar dating back 400 years and used as a tribute to emperors, due to the large fruit size (up to 680g) (3). Evaluation at the USDA Plant Introduction Station, Chico, CA (1) showed them to be among the latest blooming and most prone to delayed foliation (due to lack of sufficient chilling) of any peaches in their large collection. As a group they were not subject to peach leaf curl (*Taphrina deformans* (Berk.) Tul.) perhaps because bloom occurs after climatic conditions are favorable for inoculation (1). Fruits are white-fleshed clingstones, low-acid, and large, but few in number (1). P.I. 101686 was from Sunchiachuang village, south of Feicheng, and labeled Ta Tao No. 24. A small planting was established to determine if P.I. 101686, when used as a rootstock, would delay bloom of peach.

Materials and Methods

Three peach cultivars were used as rootstocks, based on their chilling requirements (hours below 7°C) for normal bloom. Cuttings of 'Flordaking' (450 hrs), 'Redglobe' (850 hrs) and P. I. 101686 (> 1200 hrs) were rooted under mist in late summer 1981. Parental trees were not virus-indexed at this time, but ELISA and Shirofugen tests in 1984 showed no Prunus necrotic ringspot virus present at that time. Rooted cuttings were overwintered outside in 7.5 cm peat pots and in the spring, planted at 2.5 m spacing in a seedling row. Each of 4 blocks had a 2-tree plot of each rootstock randomly arranged within the block. Trees were budded at a height of 20-40 cm to 'Sunprince' peach. 'Sunprince' scions grew successfully on 17 of the stocks budded. Trees have been maintained according to commercial recommendations except that pruning has been minimal after the first 3 years. One day each spring from 1984-1987, bloom date was estimated using the following scale: 0 = no visible bud development, 2 = most advanced bud

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showing pink, 4 = most advanced bud open, 6 = over 50% in bloom, 8 = 90% of flowers past bloom. Depending on weather and cultivar, one unit increase in rating will occur in 2-5 days at Byron. Trunk circumference 30 cm above ground was measured in November 1987. No yield data were taken. Data were analyzed using the GLM procedure of SAS (5).

Results and Discussion

Each year bloom of 'Sunprince' was delayed on P.I. 101686 rootstock compared to bloom of 'Sunprince' and 'Redglobe' and 'Flordaking' rootstocks, which were similar (Table 1). Trunk size was reduced 33% on P.I. 101686 in contrast to the other stocks. Although yield data were not taken, all trees cropped normally for the size of tree, with fruit maturing several days later on P.I. 101686.

'Siberian C' rootstock has been reported to delay scion bloom by 4 days in New Jersey in comparison to 'Lovell' (6). In contrast, no such delay was mentioned in a report from Ontario (2). 'Siberian C' and 'Lovell' are both in the NC-140 Regional Rootstock Planting at Byron. Under our conditions, 'Redhaven' on 'Siberian C' blooms no later than 'Lovell,' in contrast to the bloom delay caused by P.I. 101686. A rootstock with as high chilling requirement as P.I. 101686 has apparently not been tested before. In central Georgia 'Flordaking' scions will bloom about 1 month before 'Redglobe' scions, because intermittent warm weather occurs after 'Flordaking' has had sufficient cold but 'Redglobe' has not. If rootstock chilling requirement alone caused the bloom delay, scions on 'Flordaking' should have bloomed earlier than those on 'Redglobe,' which they did not. Other factors such as root system vigor may be involved. Peaches apparently have no rootstock chilling requirement so that root growth can occur any time soil temperatures are warm enough (7). The threshold temperature for root growth of P.I. 101686 is unknown but could be different from standard peaches.

It is not clear if any of these effects may be due to the section of the trunk that was rootstock rather than scion, since the bud union was well above ground. Virus infection could also account for the effects on tree size, since not all peach viruses would be detected by ELISA or Shiro-fugen cherry indexing tests. Although much of the P.I. collection at Chico was infected by Prunus necrotic ringspot virus, this clone may have escaped pollen infection because of its very late bloom.

As a scion, P.I. 101686 blooms and foliates relatively late at Byron, and terminates growth early in the summer so trees are smaller than those of adapted peach cultivars. Although bloom appears normal, most fruits 'button' and have dead seeds. Only rarely does the fruit described by Ackerman (1) develop on the tree at

Table 1. Effect of 3 peach cultivars as rootstocks on bloom date and trunk girth of 'Sunprince' peach scion at Byron, Georgia.

Rootstock	No. Trees	Bloom Rating[z] 1984 (Mar 12) (1367)	1985 (Mar 20) (1191)	1986 (Mar 14) (1079)	1987 (Mar 4) (1096)	1987 Trunk girth (cm)
P.I. 101686	3	5.0	6.0	4.0	3.0	23.9
Redglobe	7	7.0	8.0	7.4	4.9	36.6
Flordaking	7	7.0	8.0	7.0	4.3	39.0
Rootstock effect Significance (GLM)		<0.0001	<0.0001	0.0001	0.004	0.03

[z]Mean bloom rating scale: 2 = first pink, 4 = first bloom open, 6 = over 50% open, 8 = 90% of flowers past bloom. Accumulated chilling hours below 7°C are given below rating dates.

Byron. Therefore, it might be difficult to collect adequate seed for rootstocks, and thus this line would have to be propagated vegetatively. However, rooted cuttings of P.I. 101686 are less vigorous than lower chill cultivars and may not establish themselves as rapidly after transplanting. Currently nearly all peaches in the United States are propagated on peach seedling stocks. Fewer P.I. 101686 trees survived the scion budding process (3 of 7 *vs* 7 of 8 'Redglobe' *vs* 7 of 7 'Flordaking') but these numbers are small and not significantly different (P = 0.07 - 0.20). This line is also known to be relatively susceptible to fungal gummosis incited by *Botryosphaeria dothidea* (Moug. ex Fr.) Ces & de Not (4).

Although these results are preliminary because of the small number of trees tested, P.I. 101686 and related selections warrant further testing. A compatible rootstock providing either bloom delay or size control or both would be of value to the peach industry.

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Leaf Elemental Concentration of Highbush Blueberry Cultivars Grown on a Mineral Soil

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Abstract

Leaves from the highbush blueberry cultivars 'Bluecrop,' 'Bluejay,' 'Blueray,' 'Collins' and 'Spartan,' growing in a mineral soil with sawdust mulch, were sampled in early August for three years (1986-88) and analyzed for N, P, K, Ca, Mg, Fe, Mn, Cu and Zn to determine cultivar leaf elemental content differences. Differences among cultivars for elemental content were found for all elements analyzed except Mg, Fe, Cu, and Zn. Differences among sample years was significant for all elements. The data reveal that large enough differences exist among the cultivars sampled to warrant separate leaf samples for each in commercial blueberry fields.

Introduction

Highbush blueberry production has become an important horticultural industry in the Ozark region in the last 10 years, with about 500 ha planted as of 1989. The soils on which these blueberries are grown are all mineral types, ranging from sandy to clay loams with a natural organic matter content of 1-3%. The soils in this region are very different from the common highbush blueberry production areas that are largely sandy types high in

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