

‘Sunny Shine’: A new passion fruit cultivar with low acidity and good appearance

In Japan, passion fruit (*Passiflora edulis*) ranks third in production among tropical fruits after pineapple and mango. It is produced mainly in the southern areas and consumed as fresh fruits, juice, and for processing. Some of the problems with fresh fruit consumption are immature fruit drop during periods of high temperature (above 30°C) and high acidity after harvest. All conventional cultivars that were examined had the same problem.

To cope with these problems, JIRCAS developed the new passion fruit cultivar ‘Sunny Shine,’ which produces fruits that have lower acidity and good appearance. It was selected from seedlings obtained from a cross between JTPF-009 and ‘Summer Queen.’ JTPF-009 is a variety with a non-abscising fruit while ‘Summer Queen’ is a major passion fruit cultivar in Japan. The fruit quality and cultural performance were evaluated until 2015. In 2016, the new cultivar was named ‘Sunny Shine’ and an application for registration was filed (application number: 30972) in accordance with The Plant Variety Protection and Seed Act of Japan.

The average fruit weight of ‘Sunny Shine’ is about 110g (Table 1). The fruit color is red-purple with a smooth and glossy skin (Fig. 1). The matured fruit juice brix is about 18. The acidity of matured fruit juice during high temperature season is 1.5 to 2.0%, which is much lower than that of ‘Summer Queen’ (>2.0%), though there is no difference in juice acidity during low temperature season. ‘Sunny Shine’ has less immature fruit drop than ‘Summer Queen’ during high temperature season resulting in good coloring of the skin (Fig. 3). Days from flowering to fruit drop is longer in ‘Sunny Shine’ than ‘Summer Queen’ (Table 1) probably because it partly inherited the non-abscising characteristic of JTPF-009, resulting in lower acidity and less immature fruit drop. However, the cultural performance of ‘Sunny Shine’ is quite different depending on soil condition. The types of suitable soil and appropriate cultural management for growing ‘Sunny Shine’ are under examination.

‘Sunny Shine’ is suitable for fresh fruit consumption because of its relatively large fruit size, good aroma, high brix, lower acidity during high temperature season, and glossy appearance. The development of this new cultivar with desirable traits will enhance production and consumption of passion fruit in Japan.

(T. Ogata, S. Yamanaka, H. Takagi, N. Kozai [National Agriculture and Food Research Organization], Y. Yonemoto [Yonetropics])

Table 1. Characteristics of ‘Sunny Shine’ and ‘Summer Queen’ (2013-2015)

Month	Cultivar	Days from flowering to harvest	Yield (kg/tree)	Fruit weight (g)	Pulp & seed (%)	Brix	Acidity (%)	Sugar-acid ratio
5	Sunny Shine	62	0.27	131	43.1	17.3	3.4	5.2
	Summer Queen	64	1.38	117	46.6	18.0	2.9	6.7
6	Sunny Shine	65	2.00	113	48.3a	18.2	2.2a	8.7a
	Summer Queen	62	2.62	110	46.8b	18.4	2.8b	6.8b
7	Sunny Shine	76a	2.04a	109a	55.1a	16.9a	1.5a	11.8a
	Summer Queen	55b	1.11b	98b	46.8b	17.9b	2.3b	8.1b
8	Sunny Shine	98	0.38	110	54.4	15.5	1.5	10.8
	Summer Queen	-	-	-	-	-	-	-

a,b: Different letters indicate statistically significant differences ($p < 0.05$)



Fig. 1. Mature fruits of ‘Sunny Shine’ (top) and ‘Summer Queen’ (bottom)



Fig. 2. Fruit cross sections of ‘Sunny Shine’ (left) and ‘Summer Queen’ (right)



Fig. 3. Mature fruit color of ‘Sunny Shine’ (top) and ‘Summer Queen’ (bottom) during high temperature period